

Serial No.: 10/761,441

PD980079/RCA89866

Remarks

In view of the above amendments to the claims and the following discussion, the applicants submit that the claims now pending in the application are not obvious under the provisions of 35 U. S. C. § 103. Furthermore, the applicants believe that all of the claims satisfy the requirements of 35 U. S. C. § 112. Thus, the applicants believe that all of these claims are in allowable form.

OBJECTIONS

A. Claims

The Examiner objects to claims 1-18 because new matter is introduced into the disclosure. In particular, the Examiner indicates that the phrase "binary variable delay element" introduces new matter into the disclosure. Applicants have amended the claims to replace the phrase "binary variable delay element" with "analog delay element". In view of this amendment to the claims, the basis for the Examiner's objection thereto has been removed. Therefore, it is respectfully requested that the Examiner's objection to the claims be withdrawn.

REJECTIONS

A. 35 U. S. C. § 112

1. Claims 1-18

Claims 1-18 stand rejected under 35 U. S. C. § 112, first paragraph as containing subject matter not disclosed in the specification. In particular, the Examiner indicates that the phrase "binary variable delay element" is not

Serial No.: 10/761,441

PD980079/RCA89866

disclosed in the specification. Applicants have amended the claims to replace the phrase "binary variable delay element" with "analog delay element".

The Examiner also indicates that the phrase "wave-form-preserving element" is not disclosed in the specification. Applicants have amended the claims to delete the phrase "wave-form-preserving element".

In view of the amendments to the claims, the basis for the Examiner's rejection of claims 1-18 under 35 U. S. C. § 112, first paragraph, has been removed. Therefore, it is respectfully requested that this rejection be withdrawn.

2. Claims 1-18

Claims 1-18 stand rejected under 35 U. S. C. § 112, second paragraph as being indefinite. In particular, the Examiner indicates that the phrase "binary variable delay element" is confusing and not clear. Applicants have amended the claims to replace the phrase "binary variable delay element" with "analog delay element".

The Examiner also indicates that the phrase "wave-form-preserving element" is not clear. Applicants have amended the claims to delete the phrase "wave-form-preserving element".

In view of the amendments to the claims, the basis for the Examiner's rejection of claims 1-18 under 35 U. S. C. § 112, second paragraph, has been removed. Therefore, it is respectfully requested that this rejection be withdrawn.

B. 35 U. S. C. § 103

1. Claims 1-18 are not obvious over Buchler et al. in view of Milton et al.

Claims 1-18 stand rejected under 35 U. S. C. § 103(a) as being unpatentable over Buchler et al. (U. S. patent 6,266,305 B1 issued July 24, 2001) in view of Milton et al. (U. S. Patent 3,659,229 issued April 25, 1972). The

Serial No.: 10/761,441

PD980079/RCA89866

applicants submit that claims 1-18 are not rendered obvious by the combination of these references.

Claim 1 is directed to an apparatus for reading from or writing to optical recording media (see, specification at page 1, lines 6-7). The apparatus includes a tracking device 13, a four-quadrant detector 5, two summation points 15, 16, a phase detector 14 and variable delay elements 26X, 26Y, 26S, 26T (see, FIG. 1 and the specification at page 7, line 33 to page 8, line 30). The phase detector 14 tracks using a differential phase detection method and includes converters 19, 19' and a phase comparator 20 (see, FIG. 1 and the specification at page 10, lines 12-15). At least one of the variable delay elements is a digital variable delay element 26S, 26T for delaying only edges in an input signal which assumes just two states and at least one of said variable delay elements is an analog delay element 26X, 26Y for preserving both phase and amplitude information of its input signal (see, FIG. 1 and the specification at page 18, line 36 to page 19, line 3 and page 21, lines 28-33). At least one of the variable delay elements 26S, 26T is arranged between one of said converters 19, 19' and said phase comparator 20 and at least one of the variable delay elements 26X, 26Y is arranged between the four-quadrant detector 5 and one of said summation points 15, 16, and no digital variable delay element 26S, 26T is arranged between said four-quadrant detector 5 and one of said converters 19, 19' (see, FIG. 1 and the specification at page 11, line 22 to page 12, line 11).

Buchler et al. describes a device for reading from and/or writing to optical recording media (see, Buchler et al. at column 1, lines 5-6). The device includes a tracking device 13, a four-quadrant detector 5, two summation points 15, 16, a phase detector 14 and variable delay elements 26A, 26B, 26C, 26D (see, Buchler et al. at FIG. 1 and column 5, line 49 to column 6, line 50). The variable delay elements 26A, 26B, 26C, 26D are all arranged before the phase convertor 14 (see, Buchler et al at FIGS. 1 and 8-10 and column 5, lines 62-67 and column 15, lines 1-42).

Serial No.: 10/761,441

PD980079/RCA89866

Buchler et al. does not describe or suggest an apparatus for reading from or writing to optical recording media including a tracking device, a four-quadrant detector, two summation points, a phase detector and variable delay elements, in which the phase detector includes converters and a phase comparator, wherein at least one of the variable delay elements is a digital variable delay element for delaying only edges in an input signal which assumes just two states and at least one of said variable delay elements is an analog delay element for preserving both phase and amplitude information of its input signal, and wherein at least one of the variable delay elements is arranged between one of converters and the phase comparator in the phase detector and at least one of the variable delay elements is arranged between the four-quadrant detector and one of the summation points such that no digital variable delay element is arranged between said four-quadrant detector and one of said converters. Rather, Buchler et al. teaches a completely different arrangement in which all of the variable delay elements are arranged before the phase detector. Since, Buchler et al. does not describe or suggest an apparatus for reading from or writing to optical recording media including a tracking device, a four-quadrant detector, two summation points, a phase detector and variable delay elements, in which the phase detector includes converters and a phase comparator, wherein at least one of the variable delay elements is a digital variable delay element for delaying only edges in an input signal which assumes just two states and at least one of said variable delay elements is an analog delay element for preserving both phase and amplitude information of its input signal, and wherein at least one of the variable delay elements is arranged between one of converters and the phase comparator in the phase detector and at least one of the variable delay elements is arranged between the four-quadrant detector and one of the summation points such that no digital variable delay element is arranged between said four-quadrant detector and one of said converters, claim 1 is patentable over Buchler et al.

Serial No.: 10/761,441

PD980079/RCA89866

Milton et al. describes a system for automatic adaptive equalization of communication channels (*see*, Milton et al. at column 1, lines 4-5). The equalization system utilizes either analog or digital tapped delay lines (*see*, Milton et al. at column 5, lines 25-29).

Milton et al. does not describe or suggest an apparatus for reading from or writing to optical recording media including a tracking device, a four-quadrant detector, two summation points, a phase detector and variable delay elements, in which the phase detector includes converters and a phase comparator, wherein at least one of the variable delay elements is a digital variable delay element for delaying only edges in an input signal which assumes just two states and at least one of said variable delay elements is an analog delay element for preserving both phase and amplitude information of its input signal, and wherein at least one of the variable delay elements is arranged between one of converters and the phase comparator in the phase detector and at least one of the variable delay elements is arranged between the four-quadrant detector and one of the summation points such that no digital variable delay element is arranged between said four-quadrant detector and one of said converters. Rather, Milton et al. only describes an equalization system utilizing either analog or digital tapped delay lines. Since, Milton et al. does not describe or suggest an apparatus for reading from or writing to optical recording media including a tracking device, a four-quadrant detector, two summation points, a phase detector and variable delay elements, in which the phase detector includes converters and a phase comparator, wherein at least one of the variable delay elements is a digital variable delay element for delaying only edges in an input signal which assumes just two states and at least one of said variable delay elements is an analog delay element for preserving both phase and amplitude information of its input signal, and wherein at least one of the variable delay elements is arranged between one of converters and the phase comparator in the phase detector and at least one of the variable delay elements is arranged between the four-quadrant detector and one of the summation points such that

Serial No.: 10/761,441

PD980079/RCA89866

no digital variable delay element is arranged between said four-quadrant detector and one of said converters, claim 1 is patentable over Milton et al.

Furthermore, since Buchler et al. teaches a completely different arrangement in which all of the variable delay elements are arranged before the phase detector and Milton et al. only describes an equalization system utilizing either analog or digital tapped delay lines, the combination of these references does not describe or suggest applicant's arrangement recited in claim 1. In particular, claim 1 describes an apparatus for reading from or writing to optical recording media including a tracking device, a four-quadrant detector, two summation points, a phase detector and variable delay elements, in which the phase detector includes converters and a phase comparator, wherein at least one of the variable delay elements is a digital variable delay element for delaying only edges in an input signal which assumes just two states and at least one of said variable delay elements is an analog delay element for preserving both phase and amplitude information of its input signal, and wherein at least one of the variable delay elements is arranged between one of converters and the phase comparator in the phase detector and at least one of the variable delay elements is arranged between the four-quadrant detector and one of the summation points such that no digital variable delay element is arranged between said four-quadrant detector and one of said converters. Thus, claim 1 is patentable over the combination of these references.

Claims 2-18 depend directly, or indirectly, from claim 1. For the same reasons as stated above for claim 1, claims 2-18 are also patentable over Buchler et al. in view of Milton et al.

CONCLUSION

Thus, the applicants submit that none of the claims presently in the application are obvious under the provisions of 35 U. S. C. § 103. Furthermore, the applicants believe that all of the claims satisfy the requirements of

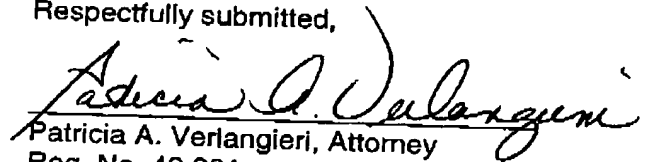
Serial No.: 10/761,441

PD980079/RCA89866

35 U. S. C. § 112. Consequently, the applicants believe that all of the claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that there are any unresolved issues requiring adverse final action in any of the claims now pending in the application, it is requested that the Examiner telephone Ms. Patricia A. Verlangieri, at (609) 734-6867, so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,


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